

Hake MSE process update

SRG meeting
February 2019

Ian Taylor - NOAA NWFSC
filling in for
Kristin Marshall - NOAA NWFSC MSE Coordinator

Outline

- ▶ Review MSE context and events of the past year
- ▶ Review work plan and timeline
- ▶ Response to SRG requests from 2018

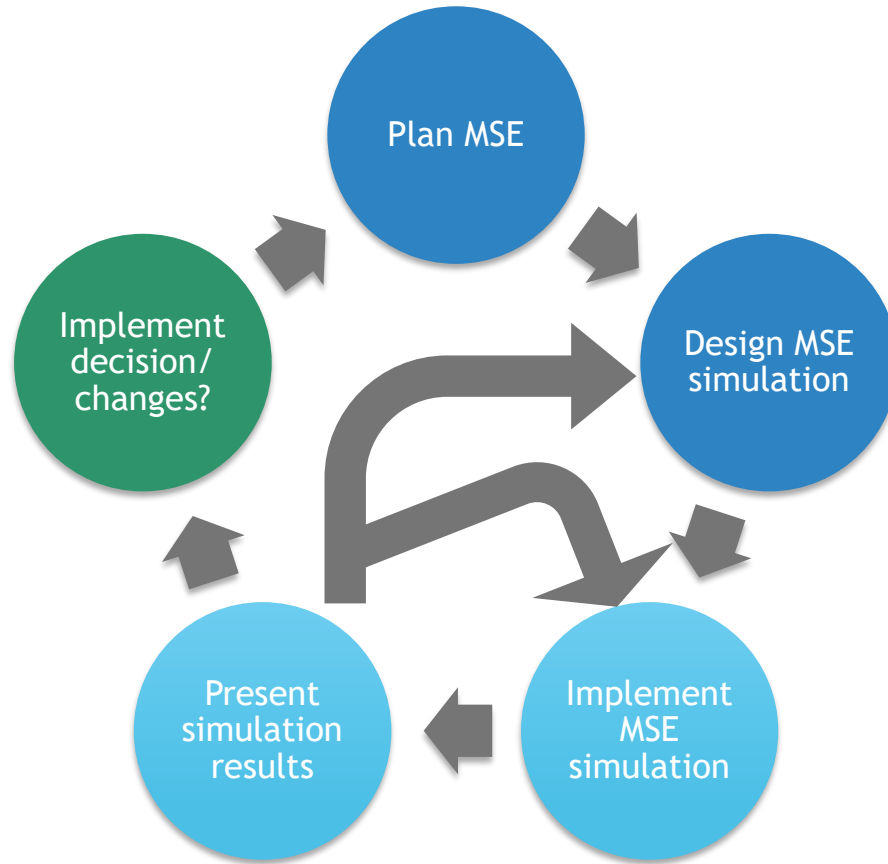
Reminder: MSE is a process meant to improve strategic decision making

- ▶ Testing the performance of management procedures (data collection, assessment, application of harvest strategies) over:
 - ▶ Many replicate “futures”
 - ▶ Future scenarios capturing “things we can’t control”, e.g. changes in productivity, recruitment, natural mortality, spatial distribution
 - ▶ Alternative hypotheses about how the fishery system functions
- ▶ Testing management procedures first in a virtual world, before considering implementing them the real world is part of due diligence
- ▶ MSE is not meant to inform tactical decision-making
- ▶ Communication throughout the process is key

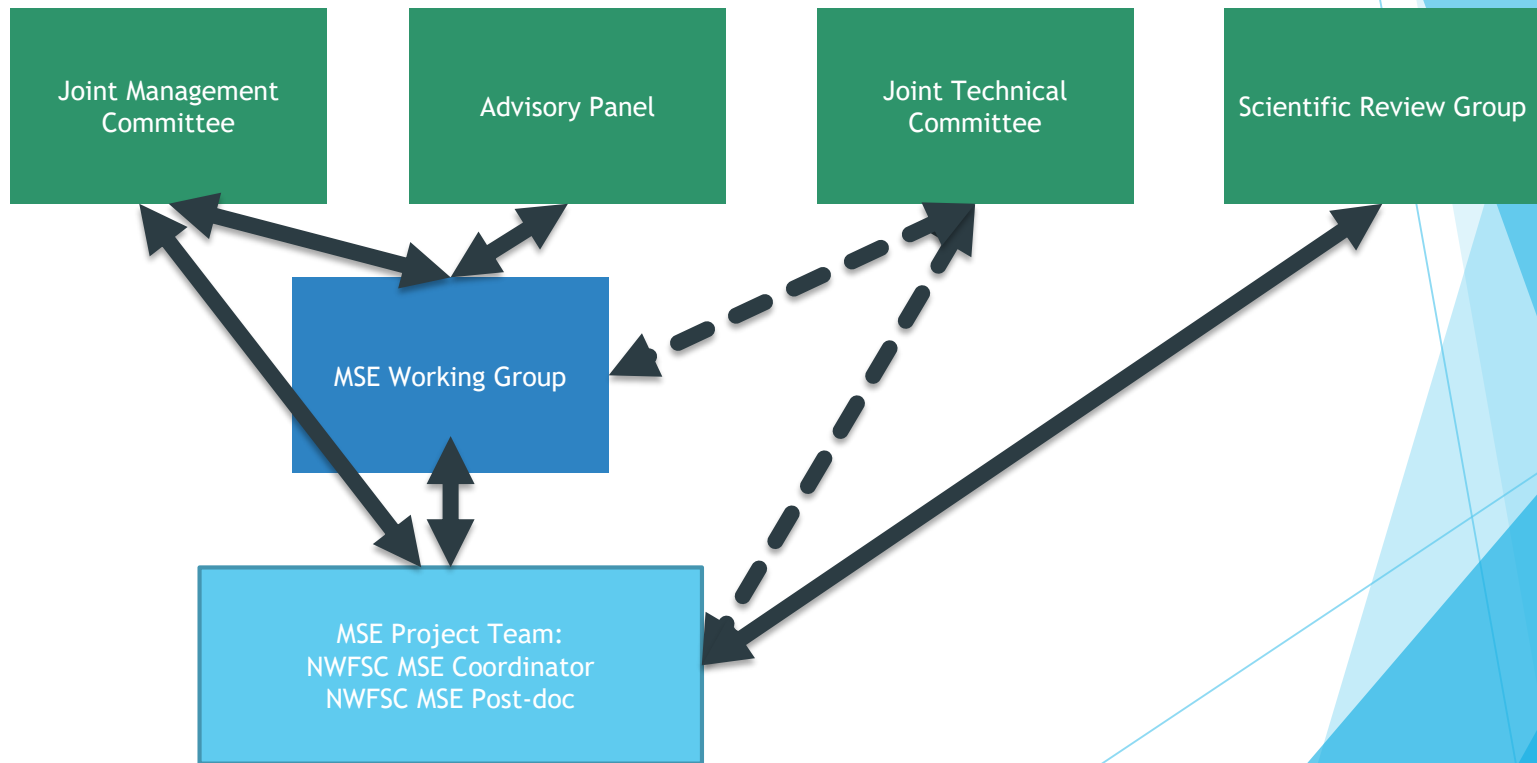
Events of the past year

- ▶ **February 2018:** draft MSE work plan reviewed by SRG
- ▶ **March 2018:** MSE work plan discussed at JMC meeting in Lynnwood
- ▶ **May-June 2018:** MSE working group phone calls
 - ▶ Call #1: Specifying Objectives and Performance Metrics
 - ▶ Call #2: Generating hypotheses for MSE operating models and FATE hake project
 - ▶ Call #3: Prioritizing scenarios for the MSE
- ▶ **July 2018:** JMC meeting in Victoria focused on MSE
- ▶ **October 2018:** JMC phone call to follow up objectives and performance metrics
- ▶ **December 2018:** JTC meeting included update on MSE progress

Review of work plan and timeline



Proposed communication plan for MSE



Overview timeline for MSE tasks

	Dec-17	Mar-18	Aug-18	Dec-18	Mar-19	Aug-19	Dec-19
1) Establish Project team and workplan							
2) Set goals for this MSE iteration							
3) Review management goals and objectives							
4) Review performance metrics							
5) Review/develop management procedures							
6) Develop environmental scenarios							
7) Identify key uncertainties							
8) Develop operating models							
9) Code for simulations							
10) Paramterize operating models							
11) Develop comminication tools							
12) Simulations			Phase I		Phase II	Phase III	
13) Technical documentation							

Plan and Design I

1. Establish project team and MSE Work group, roles and responsibilities, communication strategies, work plan
2. Establish goals for this iteration of the MSE (What problem are we trying to address?)
 - ▶ JMC's stated MSE goals:
 - ▶ Evaluate the performance of current hake management procedures under alternative hypotheses about current and future environmental conditions
 - ▶ Better understand the effects of hake distribution and movement on both countries' ability to catch fish
 - ▶ Better understand how fishing in each country affects the availability of fish to the other country in future years

Plan and Design II

3. Review goals and objectives of managers with feedback from MSE working group
4. Review performance metrics with feedback from MSE working group
5. Develop environmental scenarios
6. Identify other types of scenarios (?)
7. Develop operating and estimation models

Implement MSE simulation

8. Develop computer code for closed loop simulation
9. Parameterize operating models
10. Simulate each management strategy with each operating model and summarize and interpret performance metrics
11. Develop communication tools for simulation results

Provide results of MSE simulation

12. Present simulation results

▶ *Deliverables:*

- ▶ *First iteration, with a single non-conditioned model -JMC summer meeting 2018*
- ▶ *Second iteration, with at least one conditioned model - Feb/March 2019*
- ▶ *Third iteration, with multiple conditioned models - Aug 2019*

13. Technical documentation of results - by Dec 2019

Response to SRG requests from 2018

2019 SRG “Recommendations for the MSE and Supporting Analyses”

1. The SRG notes that the draft MSE work plan appears to address the major points of guidance provided by the SRG last year. The SRG also notes that this guidance remains pertinent to the MSE process as it evolves.
2. The SRG recommends that the performance of assessment models be tested against the more complex reality of the MSE operating model (OM) scenarios to evaluate assessment accuracy and the confidence that can be placed in the annual tactical advice (e.g., TAC) arising from stock assessment. In order to accomplish this task, the OM must be structurally different from, and more complex than, the assessment model.

The new Operating Model developed in 2018 is indeed structurally difference and more complex than the assessment model. Details to follow in presentation from Nis Jacobsen.

2019 SRG “Recommendations for the MSE and Supporting Analyses”

3. One goal of MSE processes is to evaluate the robustness of management procedures to uncertainties about the true states of nature. **The SRG recommends that operating model scenarios representing a world experiencing climate change be developed to test the robustness of current and future management procedures.**

Scenarios exploring climate change and variability in hake movement are planned for 2019.

4. The SRG continues to emphasize the importance of coordinating the hake survey and the FATE ecological investigation of summer distribution to ensure that priority data are collected and results are used to inform the operating model. The SRG commends the MSE Technical Team for including such coordination in the draft MSE work plan.

The MSE is likely to directly benefit from Mike Malick’s work under the FATE investigation in the year ahead.

2019 SRG “Recommendations for the MSE and Supporting Analyses”

5. The SRG emphasizes that the following topics (which are not listed in rank order) are important for inclusion in the development and conduct of the MSE:
 - i. Climate change and its impacts on fish and fisheries;
 - ii. Spatial distribution of fish of various ages/sizes and the resulting consequences to the parties, under alternative environmental and fishing scenarios;
 - iii. Utility of the age-one index under alternative resourcing scenarios;
 - iv. Technical aspects of assessment modeling including:
 - a. Effects of various assumptions on fecundity at age;
 - b. Evaluate methods of deriving biological reference points such as B₀;
 - c. Methods of parameterizing and constraining recruitment variation, sigma_R;
 - d. Choices in modeling fishery selectivity;
 - e. Representing spatial processes affecting the fish and the fishing;
 - v. Survey frequency, spacing and design.

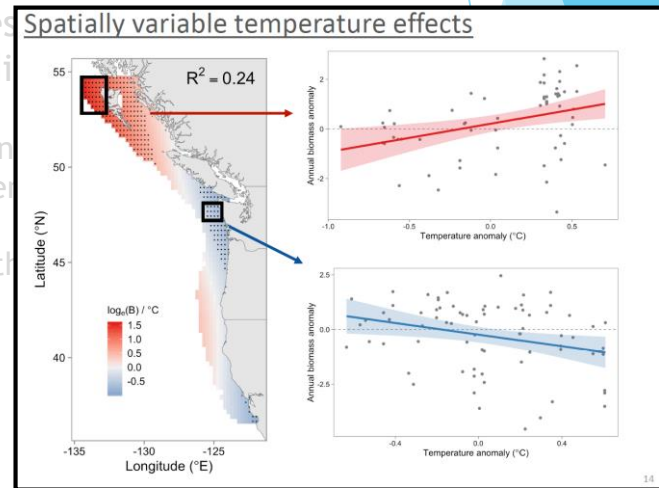
The Operating Model framework has been built to allow consideration of all of these topics, although only ii has been explored so far.

More detail on recommendation #5

5. The SRG emphasizes that the following topics (which are not listed in rank order) are important for inclusion in the development and conduct of the MSE:
- i. Climate change and its impacts on fish and fisheries;
 - ii. Spatial distribution of fish of various ages/sizes and the resulting consequences to the parties, under alternative environmental and fishing scenarios;
 - iii. Utility of the age-one index under alternative res

Planned steps include:

- ▶ *Incorporating the findings of Mike Malick's work under the Fisheries And The Environment (FATE) project*
- ▶ *Modeling trends and/or regime-like patterns of variability in movement*



More detail on recommendation #5

- ▶ *Specific plans haven't been set, but simulation framework developed by Nis Jacobsen is more flexible than past approaches so can be quickly adapted to look at these issues.*
- 5. The SFG employs a simulation framework which are not listed in rank order of importance. The framework is designed to conduct the assessment of the MSE and the JTC. The framework is designed to conduct the assessment of the MSE and the JTC. The framework is designed to conduct the assessment of the MSE and the JTC.
 - ▶ *Good links between MSE Project Team, JTC, and Survey Team should ensure that the MSE is able to focus on exploring these scenarios related to data gathering process and assessment to be tailored to the highest priority issues, including emerging needs like evaluation of trade-offs associated with saildrones.*
- iii. Utility of the age-one index under alternative resourcing scenarios;
- iv. Technical aspects of assessment modeling including:
 - a. Effects of various assumptions on fecundity at age;
 - b. Evaluate methods of deriving biological reference points such as B0;
 - c. Methods of parameterizing and constraining recruitment variation, sigmaR;
 - d. Choices in modeling fishery selectivity;
 - e. Representing spatial processes affecting the fish and the fishing;
- v. Survey frequency, spacing and design.